

Intel Introduces a GSM/GPRS Processor for Mainstream Handsets

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Intel announces the **Intel® PXA800F Cellular Processor**

Intel's new single-chip GSM/GPRS solution for enhanced applications capabilities in mainstream phones

- Combines core components of mobile phones and handheld computers onto a single chip
- Provides optimal power/performance balance for mainstream phones based on Intel® XScale™ technology
- A total communications system solution for developers

“Wireless Internet on a Chip”

Vision : Cellular Silicon Function Integration for Cost, Performance, Power, and Size

Major “Silicon” Components of a Cellular System

Digital/Analog

Applications Processor

Digital Signal Processor

Baseband Logic

Peripherals

SRAM Memory

Flash Memory

RF/Analog

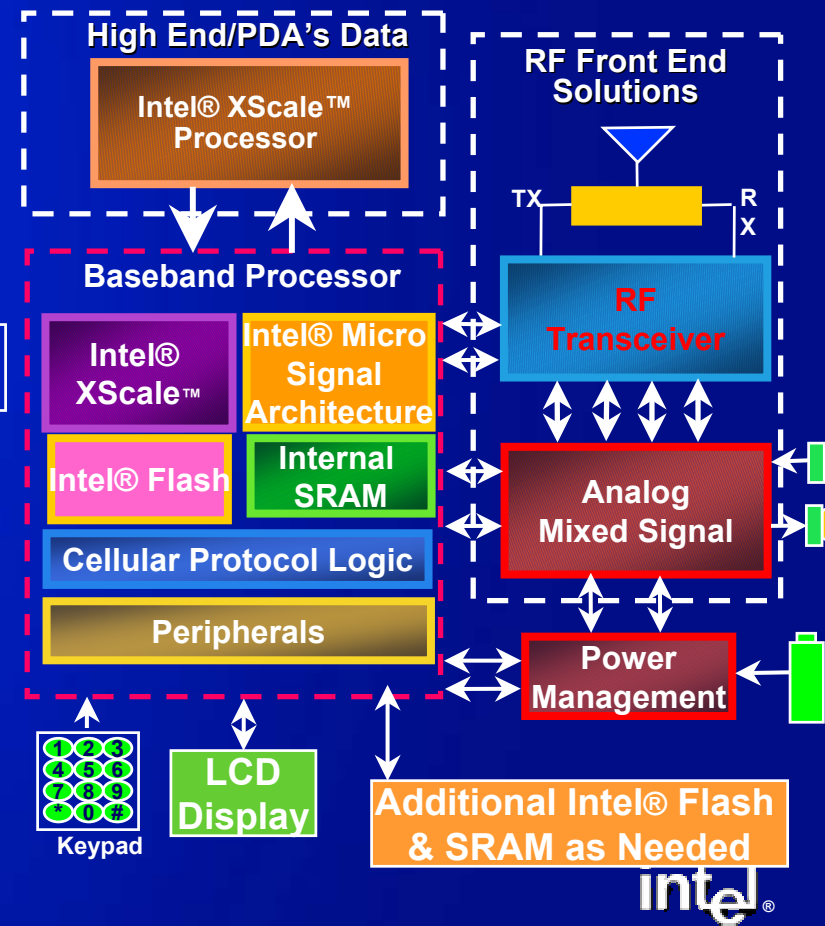
Radio Transmit

Radio Receive

Radio Power Amp

Radio Passives

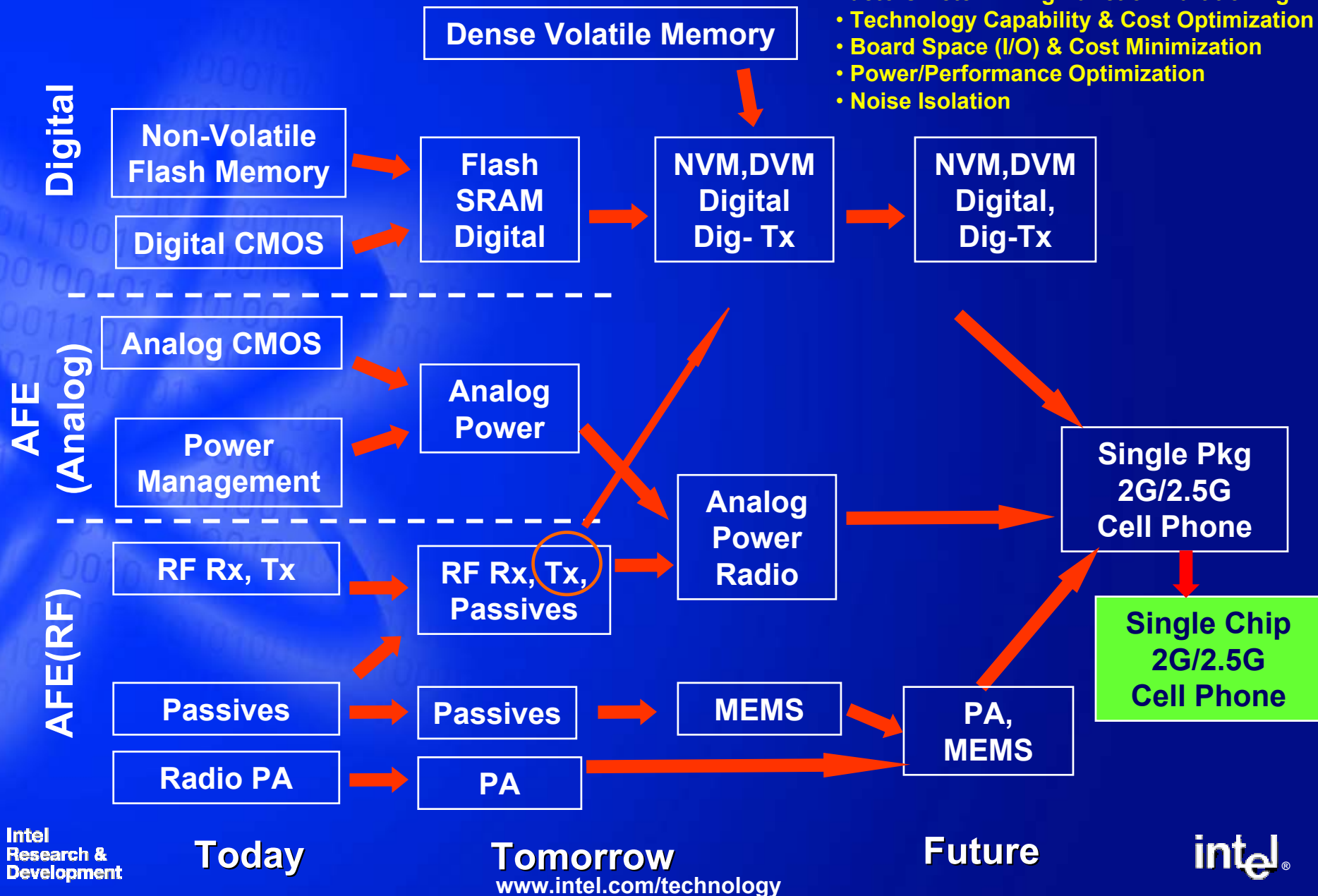
Power Supplies



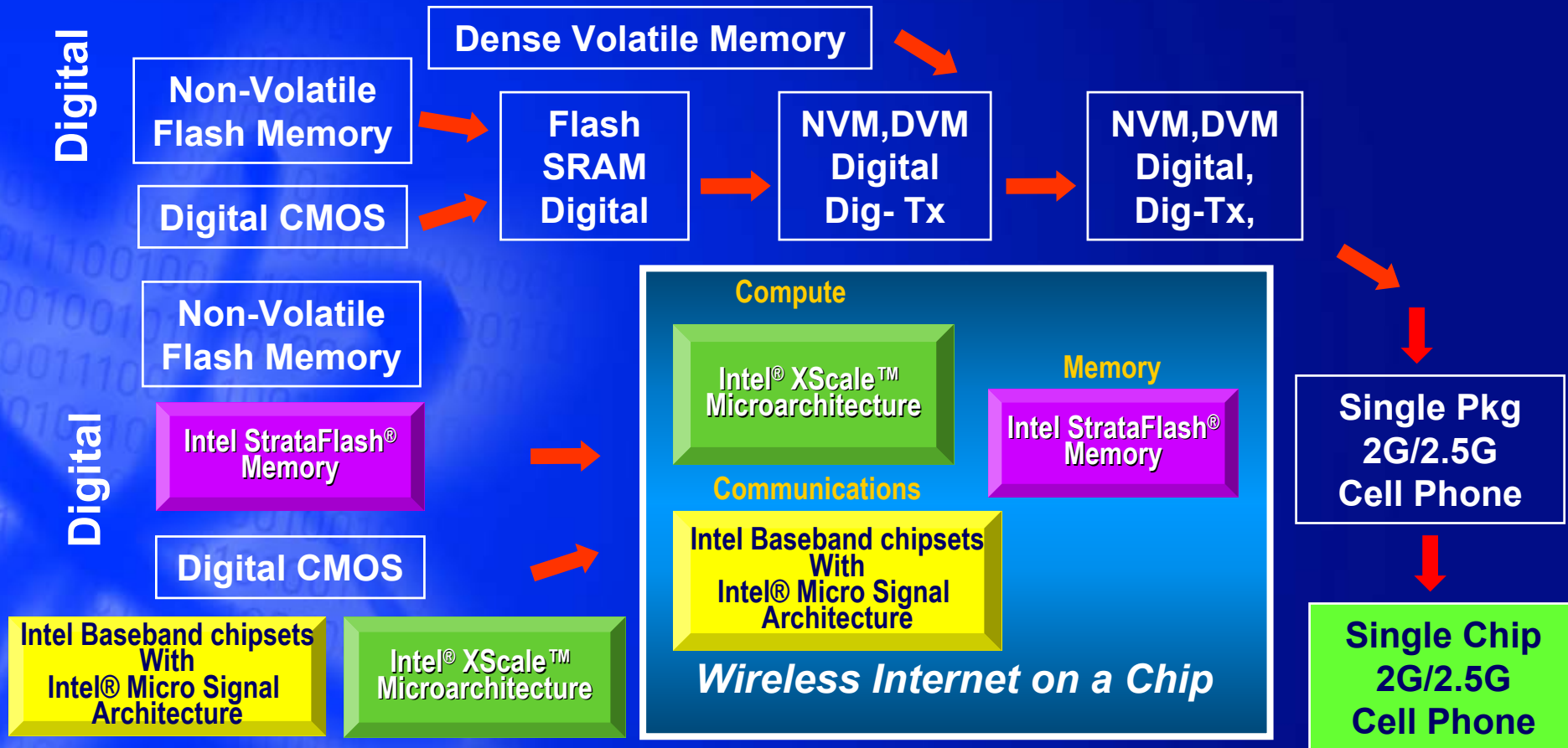
What is the Optimal Integration Strategy?

Wireless Integration Vision

- Factors Determining Function Partitioning :
- Technology Capability & Cost Optimization
 - Board Space (I/O) & Cost Minimization
 - Power/Performance Optimization
 - Noise Isolation



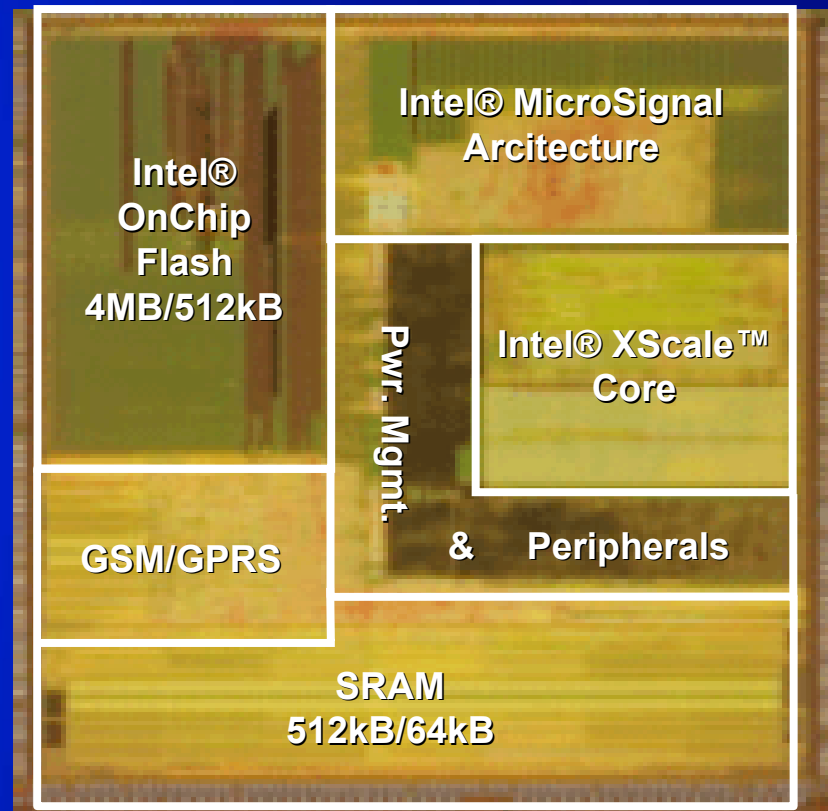
Wireless Integration Vision



- ◆ Flash Memory Integration increases performance (2x) and reduces power (2x)
- ◆ Well Established Flash and Logic Leadership
- ◆ Synergy Between Flash and Logic Technologies

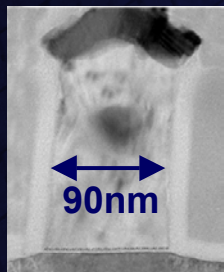
Intel® PXA800F Cellular Processor

- Intel® 0.13μ Flash + Logic Process Technology
 - ♦ First to market with F+L process for communications
- Intel® XScale™ microarchitecture
 - ♦ 104MHz & 312MHz Operating Freq. with 4MB Integrated Intel® OnChip Flash and 512kB SRAM
 - ♦ Provides high performance levels for mainstream phones
- Intel® Micro Signal Architecture
 - ♦ 104MHz Max Operating Freq. with 512kB Integrated Intel® OnChip Flash Memory and 64kB SRAM
- Integrated Power Management and Peripherals
 - ♦ Integrated USB, SD/MMC/MS, LCD, IRDA, BlueTooth* I/F, Camera I/F and other key peripherals reduce need for separate ICs
 - ♦ More power management capabilities than previous Intel® XScale™ technology-based products



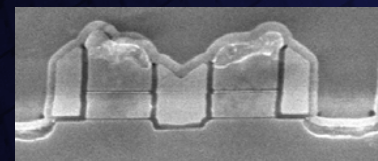
Wireless Internet on a Chip by Flash+Logic Integration

Logic



90nm Transistor Gate

Flash



0.16µm² Flash Cell
Lower power
Higher perf.
Space savings

~3X faster
access times
than external flash

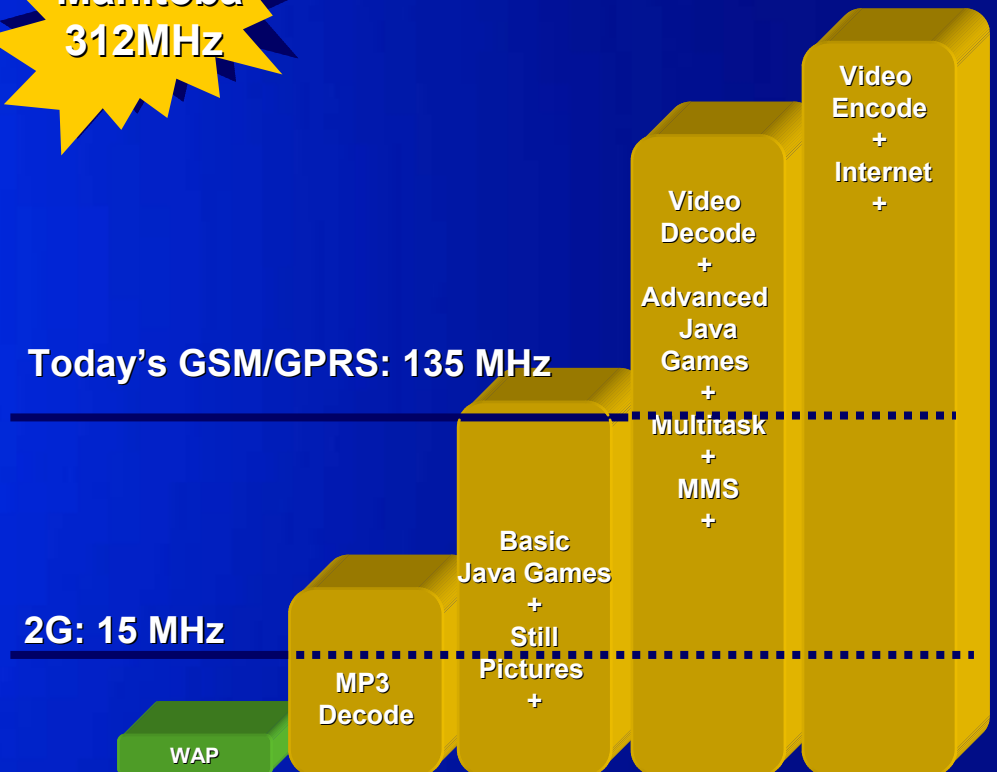
Manitoba Application Headroom

- Manitoba
 - ♦ Continuous GPRS Data (Class B)
 - ♦ Intel® MSA is running L1 & Intel® XScale™ core is running L2 and L3
- Intel® XScale™ technology
 - ♦ Intel® XScale™ core runs all applications
 - ♦ Estimates for L2/L3 = 14MIPS
 - ♦ At 312MHz has 270MIPS of application capabilities

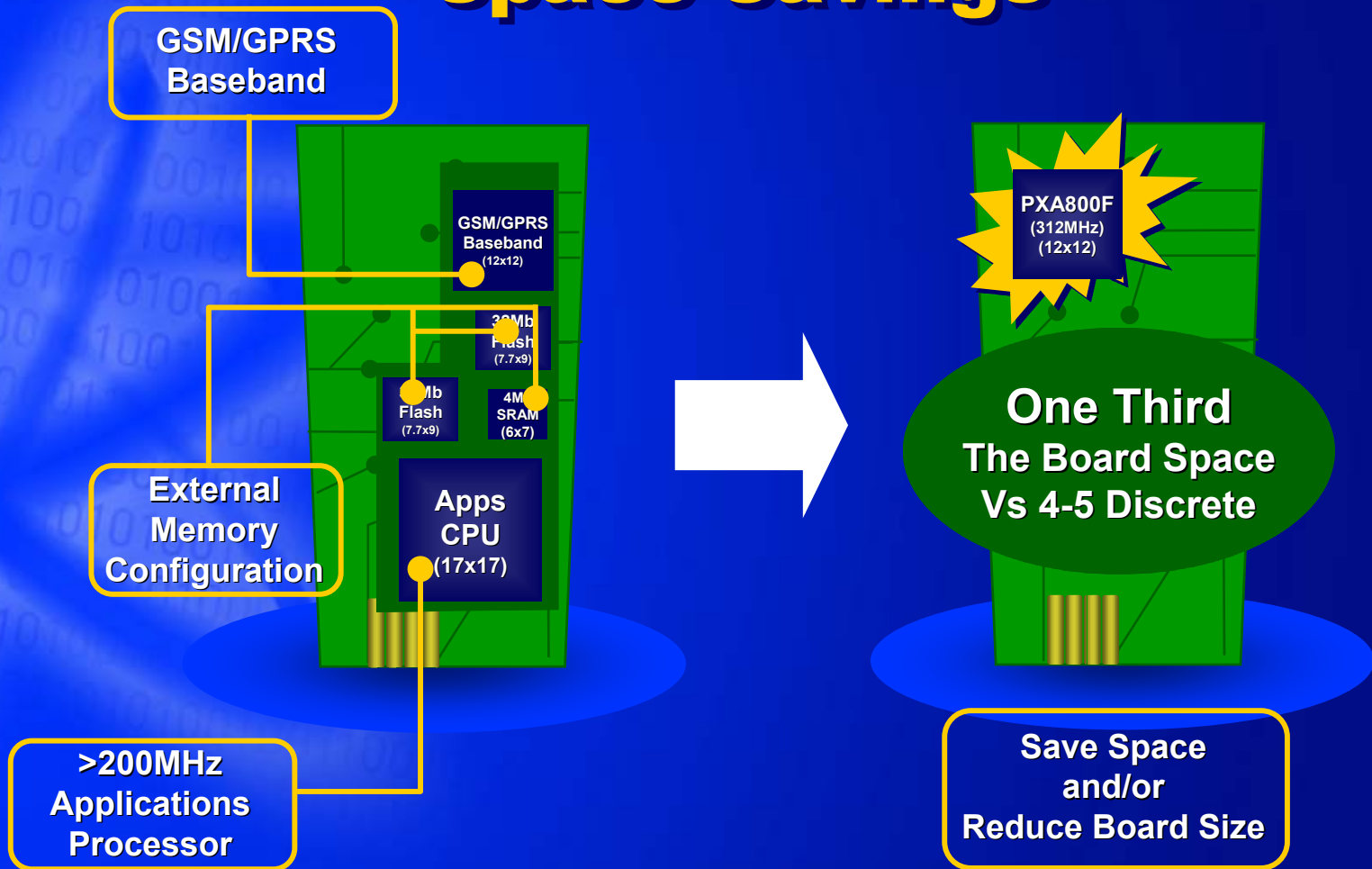
**Manitoba
312MHz**

Today's GSM/GPRS: 135 MHz

2G: 15 MHz



Intel® PXA800F Cellular Processor Space Savings

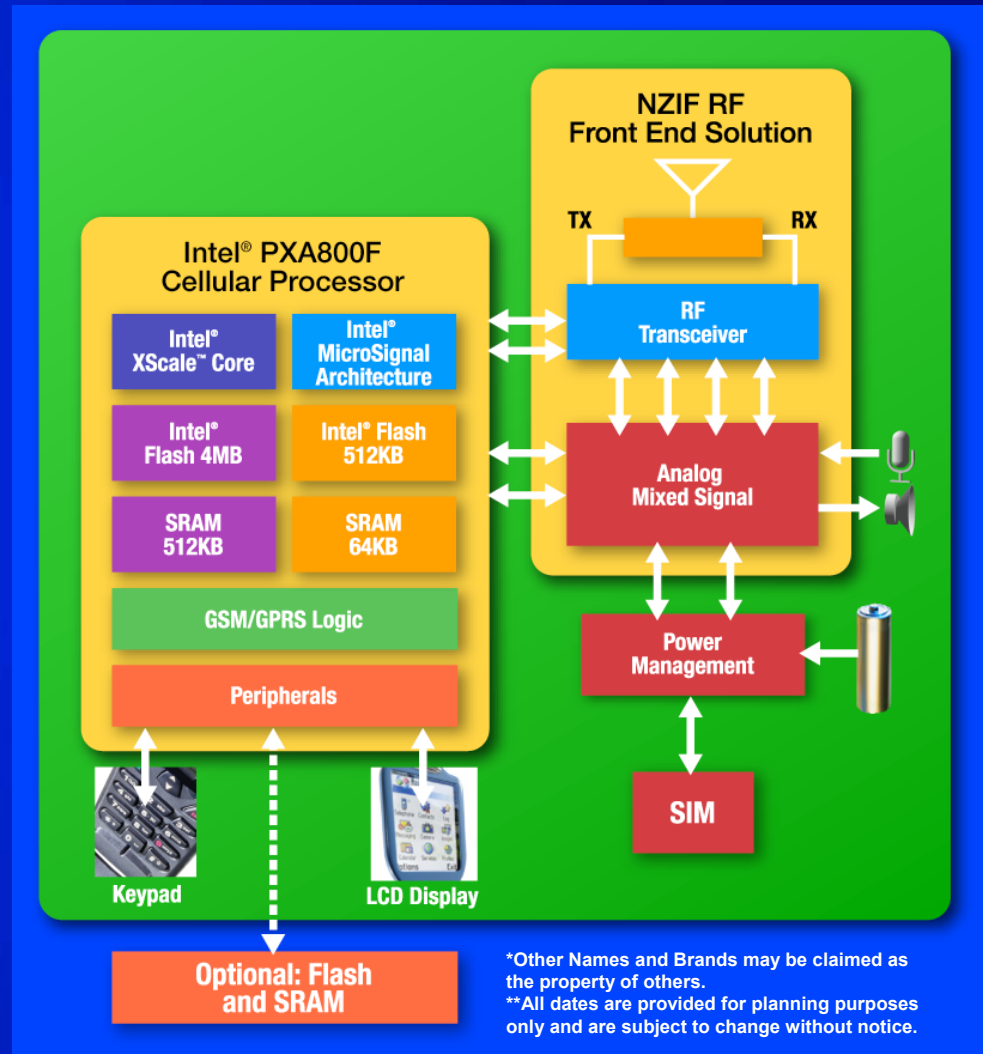


(Package Sizes proportionally correct)

intel®

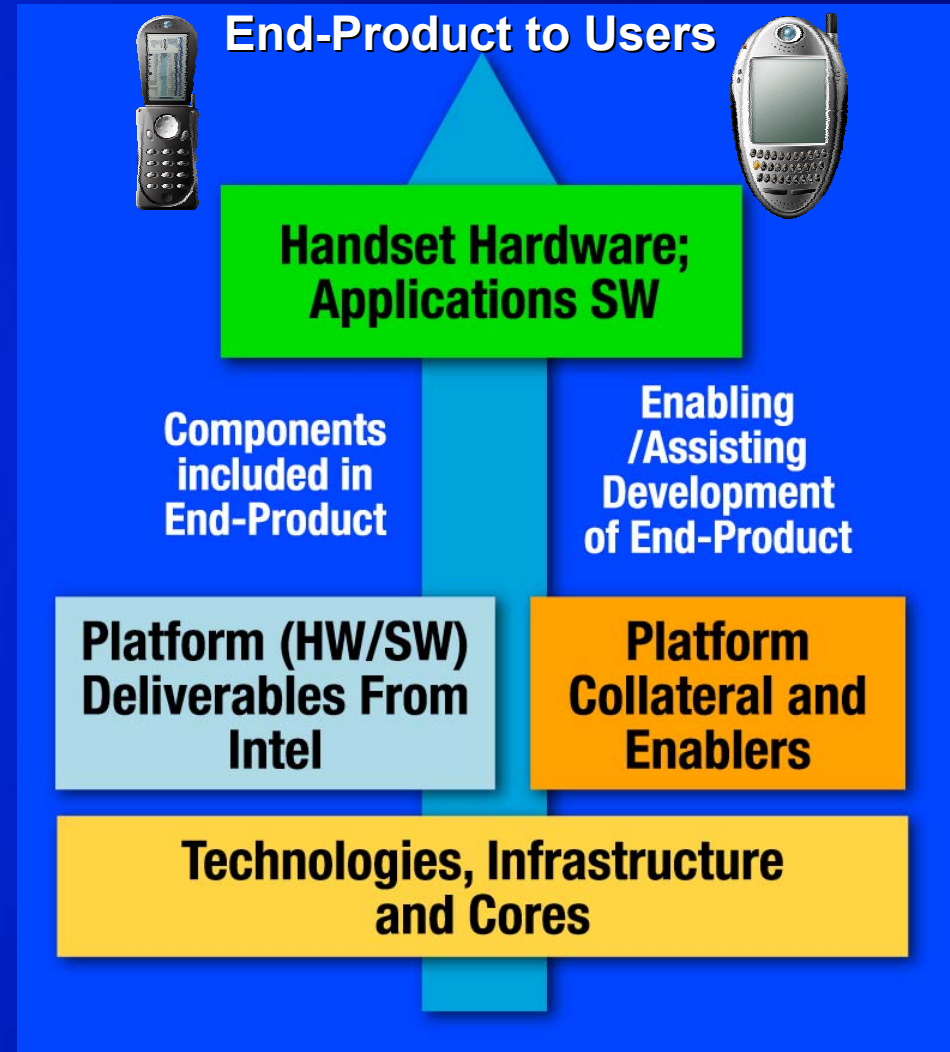
Full GSM/GPRS System Solution

- L1 protocol software available from Intel
- L2/L3 protocol software available from TTPCOM*
 - Physical layer firmware
 - Baseline MMI
 - Full featured API for customer application development
- Industry-proven mixed signal and NZIF/DDC RF solution
- Optimized Power Management Solution from Dialog*
- Handset Reference from Elektrobit* design targeted for availability in Q2'03**



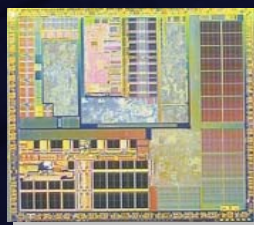
Intel® Competitive Advantages

- On-going ability to innovate in design and manufacturing to drive more functionality in smaller footprint and offer economies of scale
- Process technology investment and capacity to support high handset volume
- Expertise in software development and tools support for IA can be applied to handsets.
- Proven experience in building industry support and ecosystem



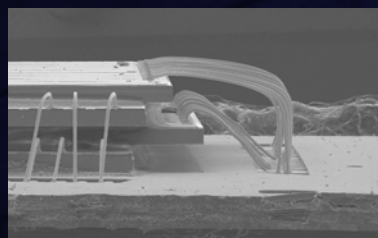
Leadership By Integration

Computing + Communications on One Chip



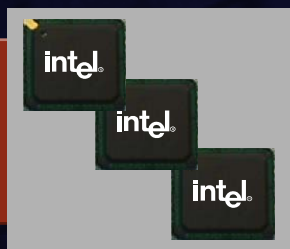
Silicon Level Integration

Functions combined on single chip



Package Level Integration

Stacked discrete chips and packages



Functions on Discrete Chips

Flash, Applications processors, Cellular chipsets

2002

2004

2006

Summary

- Intel introduces the first processor that incorporates communications, computing and memory in a single chip
- Intel's integrated solution brings enhanced functionality to the growing mainstream handset market segment
- Intel has cost effectively integrated it's leadership flash and logic technologies – without compromising performance or density – onto a single chip using one manufacturing process

Backup

Manitoba Product Features

- ❑ **GSM/GPRS Communication Processor**
 - Integrated high-performance Intel® XScale™ processor
 - 32Mb Intel® Flash memory and 4Mb SRAM integrated on-chip memory
 - Intel® 0.13μ integrated process technology
 - Re-programmable Micro Signal Architecture – digital signal processing with microcontroller features
- ❑ **Intel® Personal Internet Client Architecture**
 - Supports Intel XScale processors
 - Supports, MP3, Bluetooth*, and WAP
 - High-speed interface with communication processor
- ❑ **High-Speed Internet Access**
 - Class 1-12 GPRS
 - Voice + data & SMS
- ❑ **Broad Range of On-Chip Peripherals**
 - UART (3), SSP (4), USB, I²C, PCM (2), IrDA GPIO(20), U-SIM I/F, PWM(2), WDT, RTC, JTAG debug I/F, keypad, color LCD, pwr mgmt cntrl
- ❑ **Bluetooth Interface (UART & PCM)**
 - Supports v1.0b compliant MAC & RF
- ❑ **Application & Data Storage Expansion**
 - x16 burst memory expansion interface
 - Supports Intel® Flash Data Integrator
- ❑ **Complete GSM Phase 2+ L1-L3 Protocol Stack**
 - Intel developed L1
 - Proven L2-L3
- ❑ **Dedicated IF & RF**
 - Proven mixed signal analog
 - Super heterodyne and direct conversion RF solutions
- ❑ **Advanced Package Technology**
 - 12mm x 12mm VF-PBGA (.65mm pitch)
- ❑ **Full Development Kit**
 - Includes RF, mixed signal, USIM, Pwr mgmt, Bluetooth, and optimized SW
 - Supports MP3 and application processor based on Intel XScale microarchitecture
- ❑ **Reference Design**
 - FTA certificate verifying compliance
- ❑ **Full Customer Support**
 - Documentation, training, diagnostic tools

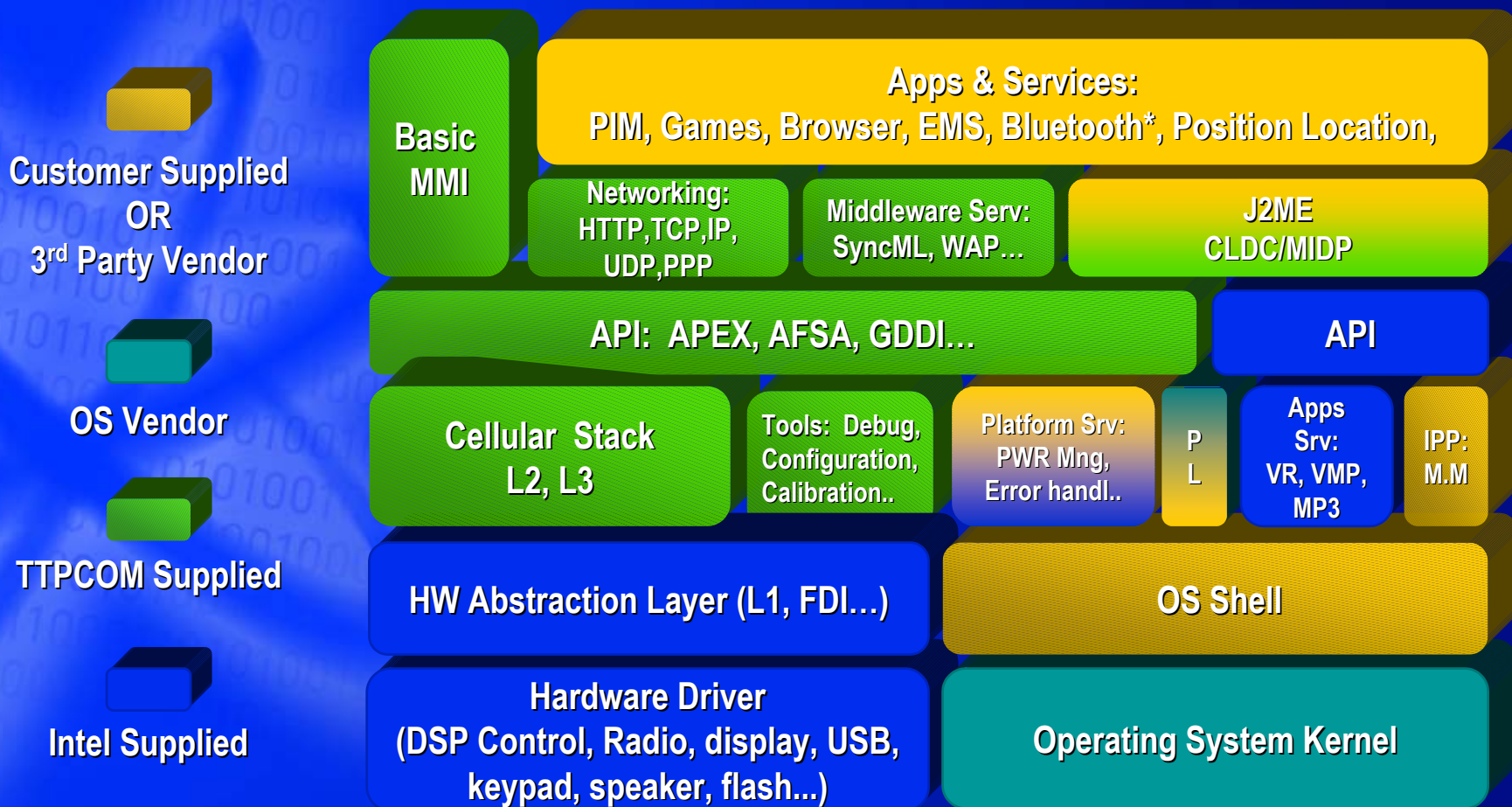
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What is a Manitoba Mainstream Phone?

- Price: \$100-250 (subsidized or unsubsidized)
- Operating System: Real-Time OS (RTOS)
- Standard features: Color Screen, Still imaging, video playback, multimedia messaging, Java™, Bluetooth, MP3 playback, multimedia games, polyphonic ringing tones. MMC/SD/MS Card Support
- Enhanced Features: GPS (location based services), Video Capture (Camcorder)
- Operating frequency: GSM 850/900/1800/1900 networks world wide



Manitoba Software Deliverables



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